UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
BIN C15700
Seattle, WA 98115-0070

NMFS Tracking
2002/01234

October 7, 2003

Colonel Ralph H. Graves
Corps of Engineers, Seattle District
Post Office Box 3755
Seattle, Washington 98124-2255

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Duhon New Bulkhead and Stairs Project.

Dear Colonel Graves:

The attached document transmits the NOAA's National Marine Fisheries Service's (NOAA Fisheries) Biological Opinion (Opinion) on the proposed Duhon New Bulkhead and Stairs Project in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531), and the results of our consultation on Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act. The U.S. Army Corps of Engineers (COE) determined that the proposed action was likely to adversely affect the Puget Sound chinook (*Oncorhynchus tshawytscha*) and Hood Canal Summer (HCS) chum Evolutionarily Significant Units. It similarly concluded that EFH would be adversely affected.

This Opinion reflects formal consultation and an analysis of effects covering the Puget Sound chinook and HCS chum in the Port Ludlow Bay, Jefferson County, Washington. The Opinion is based on information provided in the biological assessment sent to NOAA Fisheries by the COE, as well as subsequent information transmitted by telephone conversations and electronic mail. A complete administrative record of this consultation is on file at the Washington Habitat Branch Office.

NOAA Fisheries concludes that the implementation of the proposed project is not likely to jeopardize the continued existence of Puget Sound chinook or HCS chum. The project will adversely affect EFH. Please note that the incidental take statement, which includes reasonable and prudent measures and terms and conditions, was designed to minimize take. If you have any questions, please contact Barbara Wood of the Washington Habitat Branch Office at (360) 534-9307 or barb.wood@noaa.gov.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

Endangered Species Act - Section 7 Consultation
Biological Opinion
And
Magnuson-Stevens Fisheries Conservation and Management Act
Essential Fish Habitat Consultation

NMFS Tracking No. 2002/01234

Duhon New Bulkhead and Stairs Project
Jefferson County

Agency: U.S. Army Corps of Engineers

Consultation Conducted By: National Marine Fisheries Service,
Northwest Region

Issued by: For Michael R Crouse Date: October 7, 2003

D. Robert Lohn
Regional Administrator

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1.0 INTRODUCTION

This document transmits the NOAA's National Marine Fisheries Services' (NOAA Fisheries) Biological Opinion (Opinion) under the Endangered Species Act (ESA), and Magnuson-Stevens Fisheries Conservation and Management Act (MSA) Essential Fish Habitat (EFH) consultation, based on our review of the proposed Duhon New Bulkhead and New Stairs project, located in Jefferson County, Washington. The proposed project for shoreline stabilization and new stairs is located in Ludlow Bay. These areas are within the Hood Canal Summer (HCS) chum (*Oncorhynchus keta*) and Puget Sound (PS) chinook (*O. tshawytscha*) evolutionarily significant units (ESUs). Port Ludlow Bay is also EFH for 54 species of groundfishes, coastal pelagics, and three Pacific salmon species (chinook, coho (*O. kisutch*)), and PS pink (*O. gorbuscha*) salmon).

1.1 Background and Consultation History

The U.S. Army Corps of Engineers (COE) proposes to issue a Section 404 permit for the Duhon New Bulkhead and New Stairs project. To comply with the ESA, the COE requested section 7(a)(2) formal consultation, and the applicant has submitted the Biological Assessment (BA) and other related information, through the COE.

This document is based on information provided in the BA, EFH assessment, additional information, and written correspondence, as follows:

- NOAA Fisheries received the BA dated October 15, 2001, and an October 8, 2002 letter from the COE requesting formal consultation.

- On November 26, 2002, NOAA Fisheries sent a letter to the COE requesting additional information and clarification on the proposed project design, cumulative effects, and copies of environmental documents submitted to Jefferson County and Washington State Department of Fish and Wildlife (WDFW).

- The COE provided information to NOAA Fisheries on March 12, 2003.

All correspondence is documented in the administrative record, located in the Washington Habitat Branch, Lacey, Washington.

1.2 Description of the Proposed Action

An "action" includes all activities or programs of any kind authorized, funded, or carried out in whole or in part by Federal agencies in the United States or upon the high seas (50 CFR 402.02). The action analyzed here is the issuance of a permit by the COE for construction of a bank stabilization and new stairs project, to be constructed by the Duhon household. Figure 1 depicts the project and action area. The action area is that area to be affected directly or indirectly by the Federal action, and in this case includes an approximately 2.1 mile long drift cell JE- 6, which originates northeast of the site on the west side of Tala Point and terminates at the east side of a small unnamed peninsula southwestward of the site (Johannessen 1992). This includes Ludlow Creek, approximately one and one half miles west of the site.

The proposed work includes:

- Construction of a 5-foot high rock bulkhead at the toe of the bluff. The rock bulkhead will be approximately 110 feet long by five feet high and will connect to existing rock bulkheads on both ends.

- New stairs to be installed from the bluff to the bulkhead.

- Willow live stakes/fascine bundles to be placed on the slope above the bulkhead. An irrigation system will be installed over the new bulkhead.

- Twenty cubic yards of pea gravel to be spread in front of the stabilized bank on the beach at completion of work.

It is anticipated that the construction would occur over an eight week period between July 16 and October 15.

Figure 1. Map of Project and Action Area

1.2.1 Removal of Vegetation

All of the construction work will occur along the Port Ludlow Bay shoreline. The Duhons will remove approximately 900 square feet of natural vegetation over a 110 linear foot section of shoreline to construct new stairs, and attempt to stabilize the shoreline. Following construction of the stairs and shoreline armoring, the Duhons will place approximately 10 trees, 80 to 100 willow live stakes, and 50 to 60 willow fascine bundles in the voids of the rock, along with an irrigation system. The west 40 lineal feet of wall will require placement of rocks five feet high, under and between two existing large trees.

The existing logs and stumps on the beach will be temporarily placed on the landing craft and stored at the rock quarry or other suitable location, until they are placed on the beach at the conclusion of construction.

1.2.2 Armoring of the Port Ludlow Bay Shoreline

The Duhons will install about 110 feet by 5 feet of new shoreline armoring along undisturbed areas of shoreline along Port Ludlow Bay. Construction will be at, and above, the bluff toe. According to Jim Johannessen (2000), the bluff toe is at approximate elevation plus 10.0 mean lower low water (MLLW), only very slightly higher than local mean higher high water (MHHW) at Port Ludlow (plus 9.9 MLLW).

Access for re-vegetation and stair construction shall be from Ludlow Bay Road. All access for equipment, materials and labor for bulkhead construction shall be from the beach, using a landing craft. The landing craft is 50 feet long, 18 feet wide, with a minimum draft of three feet at the stern and zero feet at the bow/ramp. Maximum displacement is 50 tons. The landing craft will deliver one tracked excavator, one 10-yard dump truck, approximately sixty, 2,000 pound rocks, 10 cubic yards of quarry spalls, and 200 lineal feet of turbidity curtain/oil absorbent boom. Once installed, the turbidity curtain shall be closed at all times except when the landing craft is arriving or leaving. Oil absorbent pads shall be placed under all construction equipment on or near the beach when not in use.

The rocks and quarry spalls will be stockpiled on the beach. The approximate stockpile size will be five feet high, ten feet wide and 18 feet long. The first course of rocks will be placed in an excavated trench. All voids behind and between the rocks will be filled with quarry spalls. Sixty 1,500-pound rocks and 20 cubic yards of quarry spalls will then be delivered by the landing craft and stored in the previously used stockpile area. The second course of rocks will be placed along the waterward edge only. Additional second course rocks will be placed in back (the landward edge) with a 2- to 3-foot wide void behind and centered on each gap in the waterward rock course.

The remaining rocks, 30 hay bales, and irrigation system components will be delivered by the landing craft. The west 40 lineal feet of wall will require placement of rocks under and between two large existing trees. The contractor shall not damage these trees. The construction sequence shall be similar to what is required above, except tree planting and irrigation systems are not required. Hand excavation for the key way trench may be required under and around the existing trees.

Finally, 20 cubic yards of pea gravel will be delivered via the landing craft and placed on the beach as required by Washington Department of Fish and Wildlife (WDFW). The previously removed logs and stumps will be replaced.

1.2.3 Placement of Stairs

Stairs will be constructed from the top of the bluff to the top of the bulkhead. Stair materials will be ACZA treated wood with galvanized fasteners. Stair foundations will be driven steel pipe pilings. The pipe pilings will be two-inch diameter schedule 80 steel, approximately 12 feet long, driven in sections with a hand held pneumatic jackhammer. The lower stair landing will be landward of MHHW. The treated wood will conform to standards in the Western Wood Products Association publication, *Best Management Practices for the Use of Treated Wood in Aquatic Environments.* These industry practices are less impacting to the aquatic environment than the traditional use of creosoted timbers.

1.2.4 Rehabilitation of Port Ludlow Bay Shoreline

After construction activities, the shoreline along Port Ludlow Bay will be rehabilitated by planting native shrub and tree species, and by depositing 20 cubic yards of pea gravel along the armored shoreline to provide beach nourishment that will otherwise be lost through shoreline armoring.

The Duhons will place 10 trees, 80-to-100 willow live stakes, 50-to-60 willow fascine bundles, filter fabric, and 10 cubic yards of topsoil in the voids, with the trunks through the gaps in the waterward rock courses. The trunks will be angled up 15 to 30 degrees, and all gaps filled with quarry spalls. A wood support will be placed under each tree trunk. Compacted topsoil will be placed around each root ball up to the top of the second course rocks. Filter fabric will be placed over the topsoil and tied around the tree trunk with hemp twine.

All trees and stumps removed for construction will be replaced along the beach in their previous positions.

1.2.5 Interrelated and Interdependent Actions

Effects of the action are analyzed together with the effects of other activities that are interrelated to, or interdependent with, the proposed action. An interrelated action is one that is part of the proposed action, or depends on the proposed action for its justification. An interdependent action is one that has no independent utility apart from the proposed action (50 CFR 402.02).

In addition to the shoreline armoring and reconstruction work associated with the proposed action, the following interrelated and interdependent actions will occur: (1) artificial beach nourishment; and (2) shoreline revegetation.

2.0 ENDANGERED SPECIES ACT BIOLOGICAL OPINION

2.1 Evaluating the Proposed Action

The standards for determining jeopardy as set forth in section 7(a)(2) of the ESA are defined by 50 CFR Part 402 (the consultation regulations). NOAA Fisheries must determine whether the action is likely to jeopardize the listed species and/or whether the action is likely to destroy or adversely modify critical habitat. Critical habitat is not currently designated for PS chinook or HCS chum, therefore that analysis will not be presented. The jeopardy analysis involves the initial steps of (1) defining the biological requirements of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of mortality attributable to: (1) collective effects of the proposed or continuing action; (2) the environmental baseline; and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmon's life stages that occur beyond the action area. If NOAA Fisheries finds that the action is likely to jeopardize listed species, NOAA Fisheries must identify reasonable and prudent alternatives for the action. For the purposes of conservation under the ESA, an ESU is a distinct population segment that is substantially isolated, reproductively, from other conspecific population units and represents an important component in the evolutionary legacy of the species (Waples 1991). Puget Sound chinook and HCS chum are each ESUs that have been identified for ESA protection.

2.1.1 Biological Requirements

The biological requirements are those conditions necessary for PS chinook and HCS chum to survive and recover to naturally reproducing population levels, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

Biological requirements are generally defined as properly functioning habitat relevant to each life history stage. In addition, there must be enough of the properly functioning habitat to ensure the continued existence and recovery of the ESU. The biological requirements for PS chinook salmon and HCS chum in the marine environment include adequate food (energy) sources, high water quality, sufficient habitat structures, favorable passage conditions (migratory access to and from potential spawning and rearing areas), and appropriate biotic interactions (Spence *et al.* 1996). Specific information related to the biological requirements for PS chinook salmon can be found in Myers *et al.* (1998), and for HCS chum in Johnson *et al*. (1997).

The biological requirements for PS chinook and HCS chum that are influenced by the proposed action include the alteration of migrating and rearing habitat, as well as forage species spawning habitat, through the removal of shoreline vegetation and the armoring of shoreline along Port Ludlow Bay. The specific biological requirements affected by the proposed action include food, water quality, habitat structure, and biotic interactions.

2.1.2 Environmental Baseline

The environmental baseline represents the current set of conditions, to which the effects of the proposed action are then added. The environmental baseline is defined as "the past and present impacts of all Federal, state, and private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or informal section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation process" (50 CFR 402.02).

The project area lies on the southern shoreline of Port Ludlow Bay. Port Ludlow Bay is located in the Strait of Juan de Fuca and provides potential nearshore habitat for both the Hood Canal and Puget Sound salmonids.

2.1.2.1 Puget Sound Basin

The majority of land surrounding Puget Sound is composed of glacial deposits (Burns 1985). Much of the eastern shore of Puget Sound are characterized by steep bluffs composed of glacial till. Under natural conditions where the banks are not armored, material sloughs off via landslides caused by gravity, high pore pressures, wave action and erosion, bringing material ranging in size from boulders to clay sized particles, entire trees, and other vegetation to the beaches (Komar 1997). The construction of roads, rail lines, residences, utility corridors, and other infrastructure adjacent to the shoreline requires measures to protect them from natural shoreline erosion and thus disconnects this natural shoreline process.

2.1.2.2 Hood Canal Basin

Hood Canal is a large fjord that is separated from Puget Sound by the Kitsap Peninsula. Hood Canal averages 3.8 miles wide and 500 feet deep, with a maximum width 10.2 miles and maximum depth of 600 feet (Johnson *et al.* 1997). The canal stretches 63 miles from its mouth at Admiralty Inlet to the tip of Lynch Cove at Belfair. At the southern extent of Hood Canal, where the Skokomish River enters the Hood Canal, a 90-degree bend to the east occurs (The Great Bend).

Four WRIAs drain into Hood Canal: Kennedy-Goldbsorough (WRIA 14); Kitsap Basin (WRIA 15); Hood Canal Basin (WRIA 16); and Quilcene Basin (WRIA 17). Hood Canal has several major basins including the Skokomish, Big Quilcene, Dosewallips, Duckabush, Dewatto, Hamma Hamma, and Union rivers.

2.1.2.3 Port Ludlow Bay

The project area lies on the southern shoreline of Port Ludlow Bay (Figure 1). The beach area to the east and west was surveyed for shoreline structures and overhanging vegetation.

To the southwest for approximately 1,300 feet from the Duhon project site, the entire shoreline alternates between being hard-armored (with either rock or cement bulkheads) and having a natural beach. Immediately adjacent to the Duhon property, the shoreline is lined with a rock bulkhead. There is one pier, ramp and float structure, several moorage buoys and one boathouse extending from the beach/bluff interface in this area.

The bluffs support a myriad of trees and shrubs, including dozens of alders, maples, willows, cedars, thimble berries, salmon berries, elder berries, and ocean spray which overhung the beach. This entire southwestern shoreline is heavily forested and many of the houses are not visible from the beach. Approximately 75% of this shoreline had overhanging vegetation despite the fact that only about 50% had no armoring.

Northeast from the project site, there is a mix of hard-armored, high bluff shoreline and low-bank, natural beach. Immediately adjacent to the Duhon project to the northeast is a rock bulkhead and stairway giving access to the beach below the steep bluff. Further to the northeast heading out of Port Ludlow Bay, the bluffs decrease and the low-bank shoreline is mostly lined with American Dunegrass as well as with the trees and shrubs mentioned above.

Of the 1,800 feet surveyed along this northeastern shoreline, approximately 960 feet are armored with rock and some wood. In addition, there were two pier structures and one long (approximately 125-foot) old wood constructed boat ramp or wood skidder. Similar to the southwestern areas, some of the bluff areas are highly forested and extremely steep, making it difficult to see many of the homes from the beach. The heavily forested shoreline provided shade and large woody debris (LWD) to the beach.

The project site lies along a drift cell segment, JE-6. According to the detailed site assessment by Johannessen (2001), the site is a slow erosional beach, as opposed to a depositional beach. This means the project site supplies sediment to the drift cell.

In addition to providing habitat to PS chinook and HCS chum, the marine shorelines and intertidal areas of the action area support spawning populations of Pacific herring (*Clupea harengus pallasi*), surf smelt (*Hypomesus pretiosus*), and sand lance (*Ammodytes hexapterus*) (WDFW 2000). Migrating salmon utilize bait fish such as Pacific herring, sand lance and surf smelt as prey resources. These forage fish form an important trophic link between plankton resources and a wide variety of predatory marine organisms, including PS chinook and HCS chum.

There are no documented spawning beaches for any of these three forage fish in the immediate project area. However, surf smelt and sand lance spawning sites were found approximately 1,500 feet southwest of the project location. There are Pacific herring prespawning holding areas located approximately three to four miles east of the site between Tala Point and Foulweather Bluff. Pacific herring spawning areas occur from Foulweather Bluff south into Port Gamble Bay (Penttila 2000b).

2.1.3 Factors Affecting the Species Within the Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area is defined to mean "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."

The action area includes an approximately 2.1 mile long drift cell JE- 6, which originates northeast of the site on the west side of Tala Point and terminates at the east side of a small unnamed peninsula southwestward of the site (Johannessen 1992) (Figure 1). This includes Ludlow Creek, approximately one and one half miles west of the site.

Factors affecting PS chinook and HCS chum in the action area are similar to factors affecting these species in the Puget Sound and Hood Canal basins.

Largely, anthropogenic activities have blocked or reduced access to historical spawning grounds and altered downstream flow and thermal conditions. In general, upper tributaries have been impacted by forest practices while lower tributaries and mainstem rivers have been impacted by agriculture and/or urbanization. Diking for flood control, draining and filling of freshwater and estuarine wetlands, and sedimentation due to forest practices and urban development are cited as problems throughout the ESU. Blockages by dams, water diversions, and shifts in flow regime due to hydroelectric development and flood control projects are major habitat problems in several basins. Bishop and Morgan (1996) identified a variety of habitat issues for streams in the range of this ESU including: (1) changes in flow regime (all basins); (2) sedimentation (all basins); (3) high temperatures in some stream; (4) streambed instability; (5) estuarine loss; (6) loss of LWD in some streams; (7) loss of pool habitat in some streams; (8) blockage or passage problems associated with dams or other structures; and (9) decreased gravel recruitment and loss of estuary areas.

Estuaries and marine shorelines provide critical habitat for rearing and outmigrating salmonids. Recent studies have found that approximately 30% of the shoreline in the state has been armored, with approximately 1.7 miles of Puget Sound shoreline being armored each year (WDNR 2001; Canning and Shipman 1995b). In developed King County, nearly 90% of the shoreline (WDNR 1999) is armored. In areas with armored shoreline, natural beach nourishment materials are only delivered to the intertidal zone by very large landslides where the material is recruited over or through public infrastructure. In these areas, the intertidal zone has been starved of fined grained material, resulting in a conversion from gently sloping sandy beaches to steeper cobble and hard bottom shorelines. Furthermore, the armored shoreline promotes greater erosion of the non-armored sections of shoreline, by deflecting wave energy to these locations, which causes lowering and steepening of the shoreline. The result is a decrease in shallow nearshore habitat; nearshore habitat is highly productive for juvenile lifestages of PS chinook and HCS chum.

These impacts on the spawning and rearing environment may also have had an impact on the expression of many life-history traits and masked or exaggerated the distinctiveness of many stocks. The Puget Sound Salmon Stock Review Group (PFMC 1997) concluded that reductions in habitat capacity and quality have contributed to escapement problems for PS chinook salmon. It cited evidence of direct losses of tributary and mainstem habitat from: (1) dams; (2) loss of slough and side-channel habitat caused by diking, dredging, and hydromodification; and (3) reductions in habitat quality due to land management activities.

2.1.4 Status of Species and Habitat

After identifying the biological requirements of listed species, NOAA Fisheries must relate the status of species to the baseline. To do this, NOAA Fisheries considers the current status of the listed species, taking into account species information, *e.g.,* population size, trends, distribution, and genetic diversity. NOAA Fisheries starts with the information used in its determination to list as threatened, the ESUs considered in this Opinion. NOAA Fisheries also considers any new data relevant to the determination.

2.1.4.1 Puget Sound Chinook

Chinook salmon are the largest of the Pacific salmon (Netboy 1958), and exhibit the most diverse and complex life history strategies of all salmonids. Healey (1986) described 16 age categories for chinook salmon, seven total ages with three possible freshwater ages. Two generalized freshwater life-history types were initially described by Gilbert (1912): "stream-type" chinook salmon that reside in freshwater for a year or more following emergence; and "ocean-type" chinook salmon that migrate to the ocean within their first year. Healey (1983;

1991) has promoted the use of broader definitions for "ocean-type" and "stream-type" to describe two distinct races of chinook salmon. This racial approach incorporates life history traits, geographic distribution, and genetic differentiation and provides a valuable frame of reference for comparisons of chinook salmon populations. The generalized life history of chinook salmon involves incubation, hatching, and emergence in freshwater, migration to the ocean, and subsequent initiation of maturation and return to freshwater for completion of maturation and spawning. Some male chinook salmon mature in freshwater, foregoing emigration to the ocean.

NOAA Fisheries completed a status review of chinook salmon from Washington, Idaho, Oregon, and California in 1998, which identified fifteen distinct species ESU of chinook salmon in the region (Myers *et al.* 1998). After assessing information concerning chinook salmon abundance, distribution, population trends, risks, and protection efforts, NOAA Fisheries determined that chinook salmon in the Puget Sound ESU are at risk of becoming endangered in the foreseeable future. Subsequently, NOAA Fisheries listed PS chinook salmon as threatened (March 24, 1999, 64 FR 14308). Prohibitions against take were applied later (July 10, 2000, 65 FR 42422).

The boundaries of the Puget Sound ESU correspond generally with the boundaries of the Puget Lowland Ecoregion. Despite being in the rainshadow of the Olympic Mountains, the river systems in this area maintain high flow rates due to the melting snowpack in the surrounding mountains and temperatures tend to be moderated by the marine environment. The ESU includes all naturally spawned populations of chinook salmon from rivers and streams flowing into the Puget Sound, including the Straits of Juan de Fuca from the Elwha River eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound, and the Strait of Georgia in Washington State. This ESU encompasses all runs of chinook salmon in the Puget Sound region from the North Fork Nooksack River to the Elwha River on the Olympic Peninsula. Chinook salmon are found in most of the rivers in this region. Chinook salmon in this area all exhibit an ocean-type life history. Although some spring-run chinook salmon populations in the Puget Sound ESU have a high proportion of yearling smolt emigrants, the proportion varies from year to year and appears to be environmentally mediated rather than genetically determined. Puget Sound stocks all tend to mature at ages three and four and exhibit similar, coastally-oriented, ocean migration patterns.

The Puget Sound ESU is a complex of many individual populations of naturally spawning chinook salmon (31 historically quasi-independent populations of chinook salmon, of which 22 are believed to be extant (PSTRT 2001 and 2002)), and 38 hatchery populations (March 24, 1999, 64 FR 14308). The populations that are presumed extirpated were mostly of early-returning fish, and most of these were in the mid- to southern parts of Puget Sound, Hood Canal and the Strait of Juan de Fuca.

In most streams within Puget Sound, both short- and long-term trends in chinook salmon abundance are declining. Overall abundance of chinook salmon in this ESU has declined substantially from historical levels, and many populations are small enough that genetic and demographic risks are likely to be relatively high. Factors contributing to the downward trend include widespread migratory blockages and degradation of freshwater and marine habitat, with many upper watersheds affected by poor forestry practices and the mid- and lower-watersheds affected by agriculture and urbanization. Spring- and summer-run chinook salmon populations through the Puget Sound ESU have been particularly affected, with widespread declines throughout the ESU, and some runs believed to be extirpated (Nehlsen *et al.* 1991; March 24, 1999, 64 FR 14308). These losses represent a significant reduction in the life history diversity of this ESU (March 24, 1999, 64 FR 14308). The species status review identified the high level of hatchery production (which masks severe population depression in the ESU), as well as severe degradation of spawning and rearing habitats, and restriction or elimination of migratory access, as causes for the range-wide decline in PS chinook salmon stocks (NOAA Fisheries 1998a; 1998b).

The most recent five-year geometric mean natural spawner numbers in populations of PS chinook ranges from 42 to just over 7,000 fish. Most populations contain natural spawners numbering in the hundreds (median recent natural escapement equals 481); and of the six populations with greater than 1,000 natural spawners, only two are thought to have a low fraction of hatchery fish. Estimates of historical equilibrium abundance from predicted pre-European settlement habitat conditions range from 1,700 to 51,000 potential chinook spawners per population. The historical estimates of spawner capacity are several orders of magnitude higher than spawner abundances currently observed throughout the ESU.

Previous assessments of stocks within this ESU have identified several stocks as “at risk” or “of concern.” Long-term trends in abundance and median population growth rates for naturally spawning populations of chinook in Puget Sound both indicate that approximately half of the populations are declining and half are increasing over the length of available time series. The number of declining populations over the short-term (eight of 22 populations) is similar to long-term trends (12 of 22 populations).

The artificial propagation of fall-run stocks is widespread throughout this region. Summer/fall chinook salmon transfers between watersheds within and outside the region have been commonplace throughout this century; thus, the purity of naturally spawning stocks varies from river to river. Nearly two billion chinook salmon have been released into Puget Sound tributaries since the 1950s. The vast majority of these have been derived from local returning fall-run adults. Returns to hatcheries have accounted for 57% of the total spawning escapement, although the hatchery contribution to spawner escapement is probably much higher than that due to hatchery-derived strays on the spawning grounds. The electrophoretic similarity between Green River fall-run chinook salmon and several other fall-run stocks in Puget Sound (Marshall *et al.* 1995) suggests that there may have been a significant and lasting effect from some hatchery transplants. Overall, the pervasive use of Green River stock throughout much of the extensive hatchery network, in this ESU, may reduce the genetic diversity and fitness of naturally spawning populations.

Harvest impacts on PS chinook salmon populations averaged 75% (median equals 85%; range 31-92%) in the earliest five years of data availability and have dropped to an average of 44% (median equals 45%; range 26-63%) in the most recent five-year period.

Overall abundance of chinook salmon in this ESU has declined substantially from historical levels, and many populations are small enough that genetic and demographic risks are likely to be relatively high. Both long- and short-term trends in abundance are predominantly downward, and several populations are exhibiting severe short-term declines. All spring-run chinook salmon populations throughout this ESU are depressed.

Other concerns noted by the Biological Review Team (BRT) are the concentration of the majority of natural production in just two basins, high levels of hatchery production in many areas of the ESU, and widespread loss of estuary and lower floodplain habitat diversity and, likely, associated life history types. While populations in this ESU have not experienced the sharp increases in the late 1990's seen in many other ESUs, more populations have increased than decreased since the last BRT assessment. After adjusting for changes in harvest rates, however, trends in productivity are less favorable. Most populations are relatively small, and recent abundance within the ESU is only a small fraction of estimated historic run size.

Through the recovery planning process NOAA Fisheries will define how many and which naturally spawning populations of chinook salmon are necessary for the recovery of the ESU as a whole (McElhany *et al.* 2000).

2.1.4.2 Hood Canal Summer Chum

Hood Canal Summer-run chum salmon were listed as threatened on March 24, 1999 (64 FR 14508). This ESU includes summer-run chum salmon populations in Hood Canal and in streams of Discovery and Sequim bays on the Strait of Juan de Fuca. It may also include summer-run chum salmon in the Dungeness River, but the existence of that run is uncertain. The HCS chum ESU consists of 16 historically quasi-independent populations, nine of which are presumed to be extirpated. Most of the extirpated populations occur on the eastern side of Hood Canal, and some of the putatively extinct stocks are the focus of extensive supplementation programs underway in the ESU (WDFW and PNPTT 2000 and 2001). Distinctive life-history and genetic traits were the most important factors in identifying this ESU.

Chum salmon are semelparous; they spawn primarily in freshwater, and apparently exhibit obligatory anadromy, as there are no recorded landlocked or naturalized freshwater populations (Randall *et al*. 1987). Chum salmon also grow to be among the largest of Pacific salmon, second only to chinook salmon in adult size. Average size for the species is around 3.6 to 6.8 kg (Salo 1991). Chum salmon have the widest natural geographic and spawning distribution of any Pacific salmon (Groot and Margolis 1991), and historically may have been the most abundant of all the salmon species (Neave 1961). Neave (1961) estimated that prior to the 1940s, chum salmon contributed almost 50% of the total biomass of all salmonids in the Pacific Ocean. Presently, major spawning populations in the eastern north Pacific Ocean are found only as far south as Tillamook Bay on the Northern Oregon coast.

Chum salmon usually spawn in coastal areas and juveniles outmigrate to seawater almost immediately after emerging from the gravel that covers their redds (Salo 1991). This means survival and growth in juvenile chum salmon depends on favorable estuarine conditions. Chum spend more time in the estuarine environment than other species of salmon (Dorcey *et al*. 1978 and Healey 1982). Thus the nearshore (and intertidal) areas within the geographic region of the ESU are especially important to outmigrant juveniles (Simenstad *et al.* 1985; Hirschi *et al.* 2003).

In the Puget Sound area the spawning grounds are situated near coastal rivers and lowland streams. Summer, fall, and winter runs are present. Fall-run chum are most prevalent, but summer runs are found in the Hood Canal, the Strait of Juan de Fuca, and in southern Puget Sound (WDFW 1994). In the Hood Canal, the summer-run stocks spawn from early-September to mid-October, while spawning of the fall-run stocks begins about the third week in October and may continue into January (WDFW 1994).

Juvenile chum in Washington begin migration downstream in late January and continue through May, although there is considerable variability in the onset of migration due to the large number of cues influencing migration (Simenstad *et al.* 1982; and Salo 1991). The migration to the estuarine environment usually happens immediately after emergence (Simenstad 1998), but juveniles have been reported to remain in freshwater streams for up to a month (Salo and Noble 1953; Bostick 1955; and Beall 1972). Residence time in the Hood Canal ranges from four to 32 days with an average residence of 24 days (Simenstad 1998).

Juvenile chum consume benthic organisms found in and around eelgrass beds (harpacticoid copepods, gammarid amphipods and isopods), but change their diet to drift insects and plankton such as calanoid copepods, larvaceans, and hyperiid amphipods as their size increases to 50 to 60 mm. (Simenstad *et al.* 1982). Eelgrass beds are probably the main migration corridor for juveniles, providing both forage opportunities and refuge from predation (Simenstad *et al.* 1982).

As the spring and early summer season progress and plankton blooms and forage opportunities increase, the migration rate slows (Bax 1983). Simenstad and Salo (1982) found that as the food resources started to decrease in mid- to late-summer, juvenile chum tended to move offshore, suggesting a relationship between outmigration and prey availability.

In December 1997, the first ESA status review of west coast chum salmon (Johnson *et al.* 1997) was published. In January 2003, NOAA Fisheries convened a BRT to update the status of listed chum salmon. The chum salmon BRT met in Seattle, Washington, to review recent information on the HCS chum salmon ESU, among other chum salmon ESUs. Recent geometric mean abundance of summer chum in Hood Canal streams ranges from one to almost 4,500 spawners (median equals 109, mean equals 542). Estimates for the fraction of hatchery fish in some stream populations are greater than 60%, indicating that the reintroduction program through hatchery supplementation is resulting in spawners in streams.

Long-term trends in abundance and median population growth rates for naturally spawning populations of summer chum in Hood Canal both indicate that the number of populations declining over the short-term is fewer than those with long-term declining trends. Only two stream populations are increasing in abundance over the length of available time series, and this is almost surely due to the supplementation program on that stream. The median long-term population growth rates over all populations was one equals 0.88 (regardless of assumptions about hatchery fish reproduction), indicating that most populations are declining at an average rate of 12% per year.

Threats to the continued existence of these populations include degradation of spawning habitat, low water flows, and incidental harvest in salmon fisheries in the Strait of Juan De Fuca and coho salmon fisheries in Hood Canal (Johnson *et al.* 1997). Harvest rates on HCS chum populations averaged 9.6% (median equals 9.6%; range 7.2% - 11.8%) in the earliest five years of data availability and have dropped to an average of 5% (median equals 3.5; range 0.2% - 14.4%) in the most recent 5-year period.

Additional threats to HCS chum salmon include negative interactions with hatchery fish (fall chinook, coho, pink, and fall chum salmon) through predation, competition and behavior modification, or disease transfer. Between 1975 and 1991, an average of 8.1 million chum salmon per year were released from hatcheries in Hood Canal before the end of March. A consequence of these earlier timed releases is that the separation in outmigration timing between summer and fall chum has been reduced. Beginning in 1992 the HCS chum salmon became part of an extensive rebuilding program (WDFW and PNPTT 2000 and 2001). This program involves six supplementation and two reintroduction projects. Small numbers of marked fish collected in streams (greater than or equal to three per stream) over the 1999-2000 season indicate that straying of summer chum is occurring into non-target streams (WDFW and PNPTT 2001). Data on returns of hatchery adults exists for few of the streams in Hood Canal containing summer chum populations, as the marking of hatchery-origin fish has only recently begun. Specific mitigation measures have been identified for those hatchery programs deemed to pose a risk to summer chum, and most of the mitigation measures had been implemented by 2000. In addition, some hatchery programs have been discontinued.

Other, non-anthropogenic, risks to HCS chum exist. Long-term climatic changes, such as the Aleutian Low Pressure Index (ALP), Pacific Decadal Oscillation (PDO) Index or the Cold Tongue (CT) Index (Beamish and Bouillon 1993; Hare and Francis 1995) may also be a factor in the variability of survival of Hood Canal summer chum salmon. These oscillating "warm" and "cool" regimes occur on decadal scales. Also, predation on HCS chum by marine mammals in

Hood Canal monitored by WDFW since 1998, indicates that a few harbor seals are killing hundreds of summer chum each year (WDFW and PNPTT 2001). Estimates of seal predation ranged from 2% to 29% of the summer chum returning to each river annually.

Finally, summer chum populations in Hood Canal, south of the project site, have experienced a continuous decline for the past 30 years. This decline is a result of logging, fishery harvest practices, and agricultural practices.

A majority of the BRT votes fell in the "likely to become endangered," or "in danger of extinction" categories, with a minority falling in the "not likely to become endangered" category. The BRT has continuing concerns about the major risk factors to HCS chum, identified in previous assessments.

2.1.5 Status of the Species within the Action Area

Port Ludlow Bay is located on the west shore of Admiralty Inlet at the mouth of Hood Canal. Ludlow Creek enters Port Ludlow Bay at its western end (approximately one and one half miles west of the site). Small numbers of fall chum and coho spawn in the creek as well as larger numbers of cutthroat. It can be assumed that salmonids use the nearshore areas in Port Ludlow Bay on their outward migration. The status of PS chinook and HCS chum in the action area is similar to the status of species and habitat description in section 2.1.4, above.

2.1.6 Relevance of the Environmental Baseline to the Species' Current Status

Presently, due to degraded conditions described in the preceding section, the environmental baseline does not meet biological requirements of PS chinook and HCS chum salmon. The status of PS chinook and Hood Canal chum as threatened species is in large part a function of declining conditions in these species' environment. As described above, various anthropogenic features, such as deforestation, shoreline hardening, and disruption of hydrologic processes, have negatively influenced the biotic features necessary to support healthy populations of chinook and chum. While other factors, such as ocean conditions, harvest levels, and natural mortality from predation and disease influence the current status of these ESUs, the baseline conditions contribute to the net effect of depressing the populations' viability. In order to improve the status of these ESUs and contribute to their ability to recover, improvement in habitat conditions over the baseline condition is necessary.

2.2 Analysis of Effects

In this analysis, the probable direct and indirect effects of the action on the chinook salmon are identified. The ESA implementing regulations direct NOAA Fisheries to do so "together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02)."

Direct effects will come from the construction of the rock retaining wall and stairs along Port Ludlow Bay, which will require the removal of approximately 900 square feet of vegetation along the section of shoreline to be stabilized. The removal of trees along some sections and placement of the rock revetment will permanently prevent the establishment of mature shoreline vegetation in the future. The proposed project will cut off feeder bluffs and armor portions of the natural shorelines of Port Ludlow Bay, thus permanently adversely affecting natural beach-forming processes, including spawning beaches for surf smelt and sand lance which are important forage species. In addition, the indirect effects analysis must include the future actions required to maintain beach nourishment (the placement of material along the hardened shoreline).

2.2.1 Direct Effects

Direct effects are the immediate effects of the project on the species or its habitat. Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated.

Direct effects to the shoreline along Port Ludlow Bay include loss of shoreline vegetation and existing upper beach because of the construction of a rock wall armoring and stair placement. The work includes: (1) the removal of shoreline vegetation to construct a 110-foot by 5-foot high bulkhead; and (2) the placement of sixty 2,000-pound rocks, and 10 cubic yards of quarry spalls, along Port Ludlow shoreline. These activities will result in the physical disturbance of the beach substrate and shoreline area during removal of vegetation and construction of the 110-foot bulkhead, and the permanent loss of both natural shore conditions and approximately 900 square feet of vegetation. Temporary direct effects caused by the construction process are noise, increased turbidity in the project area, damage done to the upper intertidal shoreline by excavation equipment and barge grounding, and potential water pollution from accidental release of fuel, oil or other contaminants. These effects are all temporary alterations in nearshore juvenile salmon migratory pathways.

2.2.1.1 Noise (Pile driving)

Approximately 12 steel piles will be driven to construct the new stairs. Because all the piles will be driven upland, and not within the water, no analysis of noise effects was completed.

2.2.1.2 Turbidity

The construction activities include the placement of rock along Port Ludlow bay. Placement of structures along the shoreline can mobilize sediments that can increase turbidity. Therefore, short-term effects from the proposed action include an increase in sedimentation and turbidity associated with the placement of the armoring materials immediately at the project site.

Increased sedimentation and turbidity might affect the migration of juvenile salmonids along the altered shoreline by creating a migration barrier in the upper intertidal area. Adverse effects on salmonid migration due to the turbidity in the nearshore area will be minimized by constructing the project during the work window, when salmonid migration activity is low.

Sand lance or surf smelt eggs or larvae that may be in the sand at the time of construction might also be harmed by increased sedimentation. The approved work window for construction will also factor and surf smelt spawning. This will reduce the possibility that these species will be present in the area during the construction period. In addition, turbidity at the site will be contained in the nearshore of the project area by a turbidity barrier that will remain in place until project completion. Excavated material stockpiled on the beach will be covered to minimize turbidity plumes resulting from loose, excavated sediment.

Overall, effects sedimentation and turbidity on salmon are likely to be avoided by limiting all in-water activities to the marine timing windows, restricting operations of equipment on the beach to low tide, and using wide track/low pressure equipment. Overall, the increased turbidity and potential fine sediment deposition are not expected to measurably affect PS chinook or HCS chum, or their forage species during construction.

2.2.1.3 Intertidal Area Damage

Sand lance or surf smelt eggs or larvae that may be in the sand at the time of construction might be harmed by the operation of heavy equipment on the beach. Grounding of the landing craft and movement of machinery in the upper intertidal area will cause some beach substrate disruption. To reduce this type of impact, the WDFW requires the following measures during construction (WAC 220-110-285): (1) use of machinery on the beach will be confined to a 25-foot wide corridor immediately waterward of the new bulkhead face; (2) work at the site will take place during the allowed work window as defined above; (3) work will not occur if tidal waters are within 30-foot of the bulkhead face; (4) excavated material will be placed within the designated work corridor and covered to prevent erosion; (5) all trenches, depressions and/or holes created in the beach will be backfilled prior to inundation by tidal waters. Trenches excavated for the placement of the base rocks can remain open during construction, but fish must be prevented from entering the trenches (the turbidity barrier will help to fulfill this requirement); and (6) the appropriate sized gravel will be spread on the beach following construction.

2.2.2 Indirect Effects

Indirect effects are those effects that are caused by or will result from the proposed action and are later in time, but are still reasonably certain to occur (50 CFR 402.02). Indirect effects might occur outside of the area directly affected by the action. Indirect effects might include other actions that have not undergone section 7 consultation, but will result from the action under consideration.   These actions must be reasonably certain to occur, or they are a logical extension of the proposed action.

Permanent indirect effects include the potential loss of forage fish spawning habitat within the drift cell, and increased erosion in front of the armored section of shoreline because of the presence of the rock bulkhead and impoundment of sediment landward of the rock bulkhead.

2.2.2.1 Shoreline

The addition of the rock bulkhead and stairs will result in the partial removal of native shoreline vegetation that provide habitat elements for juvenile salmon. Shoreline vegetation provides salmonids with shade, protective cover, detrital input, and terrestrial prey in the form of insects, as the salmon migrate close to shore (Levings *et al.* 1991). The reduction in shoreline vegetation will probably cause a decrease in the overall amount of detrital input onto the beach. Certainly, insects, twigs, and small branches will fall on the beach from the existing and replanted vegetation, but the number of trees and shrubs sloughing off the bluff and rotting on the beach will be reduced.

Shoreline armoring can also limit the accumulation of large drift logs on the beach (Macdonald *et al.* 1994), which will also decrease the amount of nutrients and food sources available for migrating salmon as well as removing potential areas of refuge. However, the degree to which the proposed bulkhead would affect the future accumulation of drift logs on the beach cannot be determined. The more that the beach profile steepens and lowers as a result of the bulkhead presence, the less likely LWD will accumulate there (Macdonald *et al.* 1994). No studies assessing the magnitude of the loss of salmonid food resources caused by bulkheading have been found. However, it can presumed that the loss of natural shoreline reduces the amount of vegetation and/or woody debris necessary for food and shelter from predators.

To offset the loss of vegetation, ten willow trees will be planted in the rock bulkhead, and fascine bundles and live stakes will be placed on the bluff. In addition, a 40-foot wide by 100-foot long zone of native vegetation will be established along the top of the bluff prior to home construction. This vegetation will help stabilize the bluff and will provide organic matter and insect prey to the lower beach area. The willows planted along the bulkhead will provide shade along the shoreline which could have a positive effect on survival of surf smelt spawn (Penttila 2000a), should they ever exist at this location. In addition, these willows could potentially provide detrital input and insect prey to salmonids in the nearshore area.

The drift logs present on the Duhon beach at the time of construction will be removed and stored. Upon completion of the project, these drift logs will be returned to the beach area.

Several conservation measures will be employed to minimize the negative effects of this removal and replacement.

2.2.2.2 Net Shore Sediment Transport and Shoreline Morphology

The proposed bulkhead will be located approximately one and one-half feet waterward of the MHHW. Tait and Griggs (1991) have stated that the impoundment of sediments behind seawalls, bulkheads, or revetment is the least controversial and most significant impact of shoreline armoring. This impoundment of shoreline sediment can cause indirect long-term effects on the physical structure of the beach. Linked to these indirect effects on the physical structure of the beach are biological impacts which could affect the listed species.

One biological impact could be a loss of habitat suitable for forage fish spawning, caused by the change in beach substrate from finer to coarser material. This coarsening of beach substrate could have effects on forage fish habitat both in front of the bulkhead and downdrift from the bulkhead. Evidence collected at Sunnyside Beach, Steilacoom, by the COE suggests that bulkheading beaches result in a coarsening of the beach material in front of the bulkheads (Macdonald *et al.* 1994). As wave action and littoral drift continue to remove the finer sediment from a beach and there is no bank erosion to replenish this finer material, the sediment in front of the bulkhead will become coarser (gravel and cobbles, as opposed to sand and finer gravel). The beach profile will eventually become low enough so that waves will increasingly reach the bulkhead, unless beach material is added to replace the deficit caused by the existence of the bulkhead.

The sediment that was once available to feed the beach will be locked up behind the bulkhead. This loss of material can also affect juvenile salmonid migration, by reducing the amount of available shallow habitat that juveniles rely on for food and cover. This impoundment of material could lead to accelerated beach retreat in front of the new bulkhead, as well as increased erosion in front of beaches located at downdrift locations (Dean1986; Everts 1985). This erosion will result in a lowering and narrowing of the beach (Galster and Schwartz 1990). Bulkheads located landward of MHHW cause fewer beach impacts than those at or below MHHW; the effects occur only during high water and/or storm conditions, when these bulkheads will act to impound sediment that would otherwise be mobilized to supply local longshore sediment transport.

To temporarily offset the negative effects of shoreline armoring, peagravel will be added along the entire length of the proposed bulkhead upon completion. The peagravel will extend waterward for 20 feet and will be 3 inches deep. Placing gravel at this site would temporarily offset any further changes in beach sediment size caused by the proposed bulkhead. This graveling will also help minimize lowering and narrowing of the beach in front of the bulkhead, and would provide a source of sediment supply to the downdrift shoreline. It will temporarily (a few years) help restore the disturbed beach substrate (surf smelt spawning habitat) to its original condition. While a single application of peagravel to the site does not address the long-term effects that the structure will have on natural recruitment of beach materials, because this site has only low to moderate erosion, the effect of impounding the sediment over several decades is still not expected to be severe.

2.3 Cumulative Effects

Cumulative effects are defined as "those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation" (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they might require separate consultation pursuant to section 7 of the ESA.

Growth and development can degrade or convert suitable habitat and adjacent areas to urban, residential, industrial, commercial, or agricultural uses. Growth and development also leads to an increased need for supporting facilities, including power generating facilities, irrigation and water diversions, access roads, and utilities.

Additional shoreline armoring projects are also likely to occur to protect new private residences, further contributing to the cumulative loss of natural erosional processes in the drift cell. New and existing housing developments along the action area will continue to result in degradations to the natural shoreline processes from armoring projects, marinas, and other infrastructures related to growth and development. While all of these future actions are likely to impact habitat for aquatic species, only a subset will fall under future consultations; those that do not will be components contributing to the cumulative effects. NOAA Fisheries assumes that such future state and private actions will continue into the future at similar intensities as has been occurring in the Port Ludlow area for the past several years.

2.4 Conclusion

NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of PS chinook. The conclusion that project will not impair the likelihood of survival or recovery of PS chinook and HCS chum salmon factored the effects of the baseline conditions of the action area, the likely direct and indirect effects of the proposed project on the species, and the anticipated cumulative effects to the species. While the armoring is designed to prevent erosion, which will adversely affect natural shoreline processes over the long-term and may contribute to the need for future shoreline armoring in Puget Sound and Hood Canal, the determination of no jeopardy was reached because of the following:

- The removal of 900 square feet of shoreline vegetation eliminates only a small percentage of the potential recruitment for LWD along that section of shoreline. Moreover, the project includes replanting of native vegetation in project areas, that will somewhat offset the loss of juvenile rearing nearshore habitat and compensate for the loss of LWD recruitment potential.

- The COE will compensate for unavoidable effects to the shoreline through the placement of natural material on the beach to provide substrate for forage species and prevent accelerated beach erosion in front of the new bulkhead.

- Annual and daily construction timing restrictions minimize potential harm to forage fish, PS chinook, and HCS chum.

- Contamination from ACZA treated wood via rainwater is expected to be insignificant, as these products will be located upland, and any contaminated rainwater will infiltrate through the soils before reaching the marine waters.

2.5 Reinitiation of Consultation

Consultation must be reinitiated if the amount or extent of take specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or a new species is listed or habitat is designated that may be affected by the action (50 CFR 402.16).

2.6 Incidental Take Statement

Section 9 of the ESA prohibits take of endangered species. Federal regulation pursuant to section 4(d) of the Act extends the take prohibition to threatened species. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect listed species, or to attempt to engage in any such conduct. "Harm" is defined as significant habitat modification or degradation that actually kills or injures listed species by "significantly impairing behavioral patterns such as breeding, spawning, rearing, migrating, feeding, and sheltering" (50 CFR 222.102). "Harass" is defined as an intentional or negligent act which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3). "Incidental take" is take of listed animal species that results from, but is not the purpose of an otherwise lawful activity carried out by the Federal agency or the applicant. Under the terms of section 7(o)(2), incidental take is not prohibited, provided that such taking is in compliance with the terms and conditions of the incidental take statement required by section 7(b)(4) (16 U.S.C. 1536).

An incidental take statement specifies the effects of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize the effect of the incidental take and sets forth terms and conditions with which the action agency must comply to implement the reasonable and prudent measures.

2.6.1 Amount or Extent of Take Anticipated

As stated in sections 2.1.3 and 2.1.4, above, PS chinook and HCS chum use the action area for migration and foraging. Because these species are likely to be present in the action area during part of the year they are reasonably likely to experience effects from the proposed action. Therefore, incidental take of PS chinook and HCS chum is reasonably certain to occur. The proposed action includes measures to reduce the amount of incidental take. To ensure the action agency implements these measures, they are restated in the Terms and Conditions below.

Take caused by the proposed action is likely to be in the form of harm, where habitat modification will impair normal behavioral patterns of listed salmonids. Here, the ability of PS chinook and HCS chum to use the area to forage will be diminished by the extent to which production of forage species (terrestrial and aquatic) are affected. Because the presence of fish is highly variable over time, and the numbers of fish present in any given area is not strictly related to habitat quality, the amount of take that will occur from this diminution is difficult, if not impossible to estimate. In instances where the number of individual animals to be taken cannot be reasonably estimated, NOAA Fisheries characterizes the amount as "unquantifiable" and uses a habitat surrogate to identify the extent of take. The surrogate provides an obvious threshold for anticipated take which, if exceeded, provides a basis for reinitiating consultation.

This Opinion analyzes the effects that would result from loss or decreased function of beaches that produce foraging opportunities for PS chinook and HCS chum. The extent of take NOAA Fisheries anticipates in this statement is that which would result from the installation of 110 linear feet of rock armoring, including the removal of 900 square feet of shoreline vegetation along Port Ludlow Bay. Should either of these parameters be exceeded during construction, or if the mitigation elements not be carried forward, the reinitiation provisions of the Opinion shall apply because the action may affect species in a way not previously considered.

2.6.2 Reasonable and Prudent Measures

NOAA Fisheries believes that the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize incidental take of PS chinook and HCS chum:

1. The COE shall minimize take by taking affirmative steps to avoid or minimize excessive sediment and pollutants from delivery to the water.

2. The COE shall minimize take from shoreline vegetation removal.

3. The COE shall minimize take from altered nearshore processes.

2.6.3 Terms and Conditions

To comply with ESA section 7 and be exempt from the take prohibition of ESA section 9, the COE must comply with the terms and conditions that implement the reasonable and prudent measures. The terms and conditions are non-discretionary.

To implement RPM No. 1 above the COE shall ensure that:

a. Mechanical equipment to be used on the beach shall be limited to wide tracked vehicles. Beach work, including rock placement and vegetation removal shall occur at low tide.

b. The allowable work window for marine waters in and around Port Ludlow Bay is restricted to the time period from July 16 through October 15. All activities within the inter-tidal zone shall be conducted out of the water during low tide and will be limited to this timing window.

c. Prior to operating near the shoreline, all heavy equipment operating within 300 feet of any open water shall be checked on a daily basis for potential hydraulic leaks or other mechanical problems that could result in the accidental discharge of toxic materials. Any necessary repairs will avoid delivery of material to waters. A daily inspection log/checklist shall be maintained by the contractor.

d. Contractors shall prepare an approved spill prevention and response plan prior to construction. Spill cleanup materials and trained operators shall be available on site at all times during operation.

e. All exposed soil shall be promptly re-vegetated using a mixture of native shrub and tree plantings, immediately following construction.

To implement RPM No. 2 above, the COE shall ensure that:

a. Construction of the rock revetment toe and low sections of the walls shall minimize removal of native vegetation to reduce effects to aquatic marine organisms.

b. Shoreline vegetation removed during construction shall be replaced following project implementation in a manner that provides ecological functions similar to those existing prior to removal. Replacement should avoid causing damage to the shoreline that might necessitate future stabilization.

To implement RPM No. 3 above, the COE shall ensure that:

a. Drift logs and/or shoreline woody material removed during construction shall be replaced following project in a manner that provides ecological functions similar to those existing prior to removal. Replacement should avoid impacting the project or causing damage to the shoreline that might necessitate future stabilization.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (section 305(b)(2));

- NOAA Fisheries must provide conservation recommendations for any Federal or state action that would adversely affect EFH (section 305(b)(4)(A));

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (section 305(b)(4)(B)).

The term "EFH" means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA section 3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of forage or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

An EFH consultation with NOAA Fisheries is required for any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of Essential Fish Habitat

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for federally-managed fisheries within the waters of Washington, Oregon, and California. Designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (370.4 km) (PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years) (PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border (PFMC 1999).

Detailed descriptions and identifications of EFH are contained in the fishery management plans for groundfish (PFMC 1998a), coastal pelagic species (PFMC 1998b), and Pacific salmon (PFMC 1999). Casillas et al. (1998) provides additional detail on the groundfish EFH habitat complexes. Assessment of the potential adverse effects to these species' EFH from the proposed action is based, in part, on these descriptions and on information provided by the COE.

3.3 Proposed Actions

The proposed action and action area are detailed above in Sections 1.2 and 2.1.3 of this document. The project encompasses habitats that have been designated as EFH for various life-history stages of 46 species of groundfish, four coastal pelagic species, and three species of Pacific salmon (Table 1).

3.4 Effects of Proposed Action

As described in detail in section 2.2 of this document, the proposed action may result in short- and long-term adverse effects to a variety of habitat parameters. These adverse effects are:

1. Short-term degradation of habitat because of removal of shoreline vegetation.

2. Long-term degradation because of shoreline armoring.

3.5 Conclusion

NOAA Fisheries concludes that the proposed action would adversely affect the EFH for the groundfish, coastal pelagic, and Pacific salmon species listed in Table 1.

3.6 Essential Fish Habitat Conservation Recommendations

Pursuant to Section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. Although NOAA Fisheries understands that the conservation measures described in the BA will be implemented by the COE, it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. Consequently, NOAA Fisheries recommends that the COE implement the following conservation measures to minimize the potential adverse effects to designated EFH listed in Table 1.

1. To offset the adverse effects of short-term degradation of habitat from removal of shoreline vegetation, the following conversation measures are recommended:

    a. Mechanical equipment to be used on the beach should be limited to wide tracked vehicles. Beach work, including rock placement and vegetation removal should occur at low tide.

    b. Prior to operating near the shoreline, all heavy equipment operating within 300 feet of any open water should be checked on a daily basis for potential hydraulic leaks or other mechanical problems that could result in the accidental discharge of toxic materials. Any necessary repairs will avoid delivery of material to waters. A daily inspection log/checklist should be maintained by the contractor.

    c. Contractors should prepare an approved spill prevention and response plan prior to construction. Spill cleanup materials and trained operators shall should be available on site at all times during operation.

d. All exposed soil should be promptly re-vegetated using a mixture of native shrub and tree plantings, immediately following construction.

e. Construction of the rock revetment toe and low sections of the walls shall should be minimize removal of native vegetation to reduce effects to aquatic organisms.

2. To offset the adverse effects of long-term degradation of habitat because of shoreline armoring, the following conservation measure is recommended:

   Drift logs and/or shoreline woody material removed during construction should be replaced following project implementation in a manner that provides ecological functions similar to those that existed prior to removal. Replacement should not impact the project or cause damage to the shoreline that might necessitate future stabilization.

3.7 Statutory Response Requirement

Pursuant to the MSA (section 305(b)(4)(B)) and 50 CFR 600.920(kj), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The COE must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920(l)).

Table 1. Fish species with designated EFH in Puget Sound

Groundfish Species	redstripe rockfish *S. proriger*	Dover sole *Microstomus pacificus*
spiny dogfish *Squalus acanthias*	rosethorn rockfish *S. helvomaculatus*	English sole *Parophrys vetulus*
big skate *Raja binoculata*	rosy rockfish *S. rosaceus*	flathead sole *Hippoglossoides elassodon*
California skate *Raja inornata*	rougheye rockfish *S. aleutianus*	petrale sole *Eopsetta jordani*
longnose skate *Raja rhina*	sharpchin rockfish *S. zacentrus*	rex sole *Glyptocephalus zachirus*
ratfish *Hydrolagus colliei*	splitnose rockfish *S. diploproa*	rock sole *Lepidopsetta bilineata*
Pacific cod *Gadus macrocephalus*	striptail rockfish *S. saxicola*	sand sole *Psettichthys melanostictus*
Pacific whiting (hake) *Merluccius productus*	tiger rockfish *S. nigrocinctus*	starry flounder *Platichthys stellatus*
black rockfish *Sebastes melanops*	vermilion rockfish *S. miniatus*	arrowtooth flounder *Atheresthes stomias*
bocaccio *S. paucispinis*	yelloweye rockfish *S. ruberrimus*	
brown rockfish *S. auriculatus*	yellowtail rockfish *S. flavidus*	**Coastal Pelagic Species**
canary rockfish *S. pinniger*	shortspine thornyhead *Sebastolobus alascanus*	anchovy *Engraulis mordax*
China rockfish *S. nebulosus*	cabezon *Scorpaenichthys marmoratus*	Pacific sardine *Sardinops sagax*
copper rockfish *S. caurinus*	lingcod *Ophiodon elongatus*	Pacific mackerel *Scomber japonicus*
darkblotch rockfish *S. crameri*	kelp greenling *Hexagrammos decagrammus*	market squid Loligo opalescens
greenstriped rockfish *S. elongatus*	sablefish *Anoplopoma fimbria*	**Pacific Salmon Species**
Pacific ocean perch *S. alutus*	Pacific sanddab *Citharichthys sordidus*	chinook salmon *Oncorhychus tshawytscha*
quillback rockfish *S. maliger*	butter sole *Isopsetta isolepis*	coho salmon *O. kisutch*
redbanded rockfish *S. babcocki*	curlfin sole *Pleuronichthys decurrens*	Puget Sound pink salmon *O. gorbuscha*

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